15¢
$5.50 A YEAR
March 4, 1961
VOL. 79, NO. 9 PAGES 129-144

SCIENCE NEWS LETTER

RECEIVED
MAR - 7 1961
MIAMI UNIVERSITY
LIBRARY

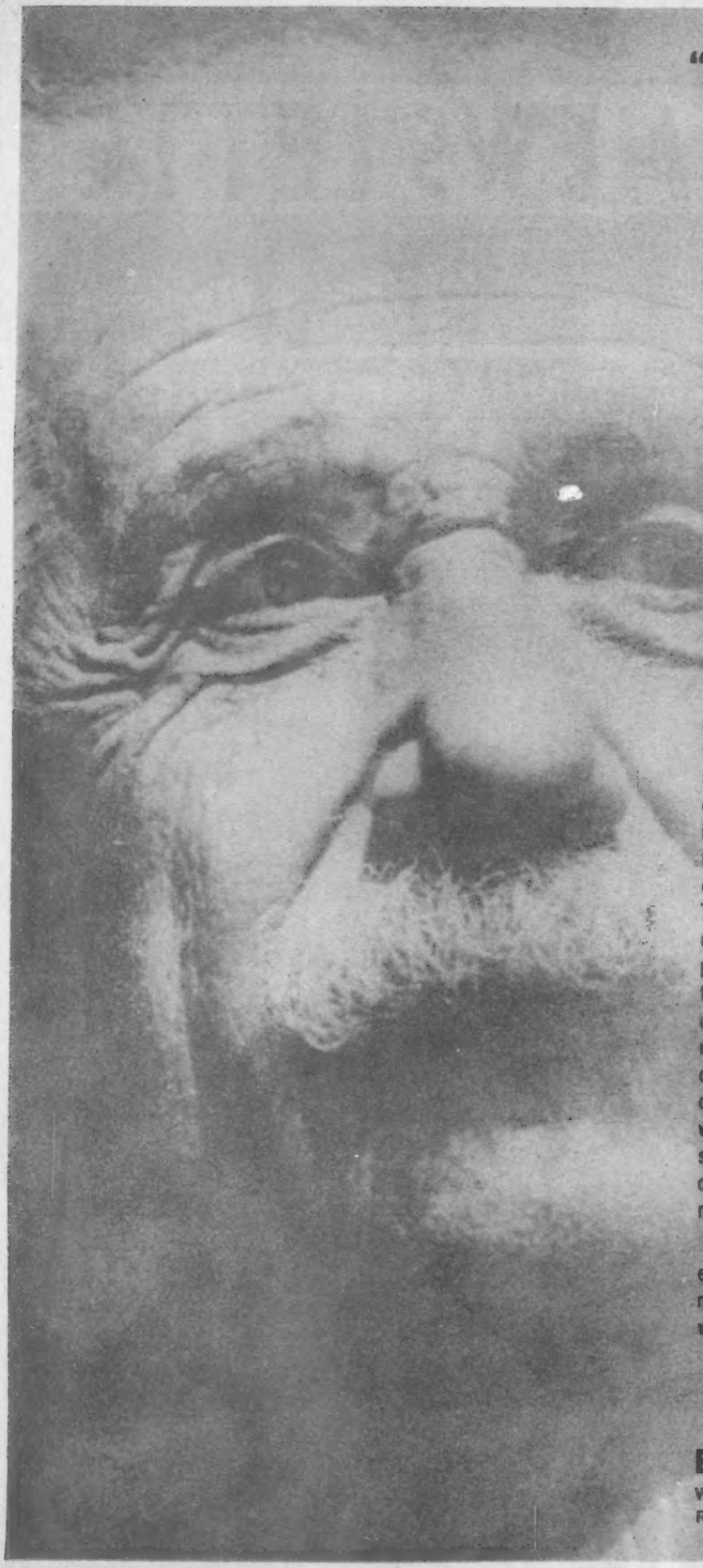
THE WEEKLY SUMMARY OF CURRENT SCIENCE

1,000,000-Ton Iceberg

See Page 134

MIAMI UNIV LIBRARY
PERIODICAL RECORD
OXFORD OHIO
DEC 61 844-127 SA 4

A SCIENCE SERVICE PUBLICATION



"IMAGINATION IS MORE IMPORTANT THAN KNOWLEDGE"

Albert Einstein

There are some who might argue this point with Einstein. But this much is certain: Wherever new knowledge is sought, imagination lights the way. And surely, only imagination of rare quality could have led Einstein to formulate his principle of relativity.

Einstein applied the insight of imagination to basic science. But imagination can be just as powerful in the creation and application of technology. And nowhere, perhaps, is imagination challenged over so wide a range in both science and technology as in the problems of electrical communications.

At Bell Telephone Laboratories, scientists and engineers range far and deep in search of the answers. They probed deep into solid-state physics to discover the transistor principle, and they speculated and synthesized in an entirely different area of knowledge to create the giant microwave system that carries your TV programs across the country. They study ways to protect the giant molecules in plastic cable sheath, and they explore the basic information content of speech to devise better ways to transmit it. They devise ultrasensitive amplifiers to capture radio signals from distant places, while they conceive and develop new switching systems of unprecedented capabilities. Side by side with the development of transoceanic cable systems they are exploring the possibilities of world-wide communications via man-made satellites.

By exploring every pathway to improved electrical communications, they have helped make your Bell System communications the world's best and they will work to keep it so.

BELL TELEPHONE LABORATORIES

WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT

BIOCHEMISTRY

How Plants Form Food

Scientists have found that photosynthesis, the process used by green plants to produce food, is dependent on two photochemical reactions rather than one as previously thought.

▶ PHOTOSYNTHESIS, the process by which green plants manufacture food, depends on two primary photochemical reactions rather than one as has been previously believed, Dr. Eugene Rabinowitch of the Photosynthesis Laboratory of the University of Illinois reported.

This new knowledge brings scientists a step closer to duplicating this life-giving plant function in the laboratory.

The two photochemical reactions, observed by Dr. Rabinowitch and Dr. and Mrs. Govindjee, who worked with him, involve the conversion of light energy to chemical energy by the formation of certain energy-rich chemical compounds. The process must proceed at balanced rates if efficient photosynthesis is to result.

What is affected is chlorophyll-a, he told the Biophysical Society meeting in St. Louis. His studies show that this main blue-green pigment, known to take up light energy directly from other pigments in green plants, has at least two components with slightly displaced absorption bands.

Activation of only one of these components by light is not enough to produce photosynthesis. But if both are excited at the same time, complete photosynthesis results.

Dr. Stacy French of Stanford University verified these findings in independent studies, Dr. Rabinowitch reported.

Dr. Rabinowitch and his co-workers also found that plant cells contain small amounts of a pigment capable of inhibiting the photosynthetic activity of "inefficient" forms of chlorophyll-a. "Inefficient" forms produce oxygen in the presence of light but do not reduce carbon dioxide necessary for full photosynthesis. The inhibiting pigment, however, does not affect the chlorophyll-a that received absorbed light by transfer from other pigments.

The scientist believes ultimately it will be possible to concentrate and isolate this new pigment.

He also discovered that there are at least five different forms of chlorophyll-a in living plant cells, revealed by spectral light studies. Only three such forms have been suggested by earlier studies, which were limited to the red portion of the light spectrum. Dr. Rabinowitch found the five forms in the blue absorption band.

• Science News Letter, 79:131 March 4, 1961

Heredity Mechanism

▶ A DISCOVERY on the mechanics of heredity has resulted from direct examination by electron microscopy of the giant molecules involved, Dr. Liebe F. Cavalieri of the Sloan-Kettering Institute for Cancer Research reported.

The highly magnified look at the DNA deoxyribonucleic acid) molecule, which controls the transmission of inherited characteristics has revealed that a different process may be involved in the self-duplication activity by which living organisms perpetuate their kind. Two classes of DNA molecules, each composed of long chains of nucleotides, arranged respectively in double spirals and pairs of double spirals, have been found, Dr. Cavalieri told scientists at the Biophysical Society meeting in St. Louis.

In studies of pneumococcus DNA, it was found that the two double spirals of the molecule lie side by side rather than intertwined with each other, as previously believed.

It was believed that replication in heredity involved the uncoiling of these strands, but now it appears rather that each double spiral transfers its genetic information by forming an entirely new adjacent double spiral.

"This makes it easier to understand the mechanics of replication at the higher chromosomal level," Dr. Cavalieri said.

Any simplification of the complex process of heredity is important in treating and preventing some diseases, in controlling resistance to drugs, in regulating and promoting growth, in making possible synthesis of proteins and in other fields.

Ultimately, better understanding of heredity can lead to some control where congenital diseases and other inherited malformations may be eliminated.

• Science News Letter, 79:131 March 4, 1961

BIOPHYSICS

Irradiated Cells Die Faster

▶ WHEN WHITE BLOOD CELLS are given an overdose of radiation, they die in the same way as normal cells, but much faster.

Dr. Robert Schrek of the Veterans Administration Hospital in Hines, Ill., reported at a New York Academy of Sciences conference in New York that normal and irradiated cells both died from intranuclear vacuolization, the formation of bubbles in the nucleus of the cell.

Normal, healthy white blood cells from humans survived just under ten days outside the body, but cells removed from the blood stream and given ten roentgens of radiation, about one-forthieth the amount required to kill a man, lived only six days. A dose of 4,000 roentgens killed the cells in a few hours and 1,000 killed in 12 to to 24 hours. (Cells and tissues withstand higher doses of radiation when exposed outside the body).

Dr. Schrek also found that human white cells are much more sensitive to radiation than are those from the rat, rabbit and guinea pig.

Normal survival time for healthy rat cells is just under two and a half days. Total body irradiation with 50 roentgens killed white cells in blood samples in about 20 hours.

• Science News Letter, 79:131 March 4, 1961

IRRADIATING BRAIN TUMORS—Patients with malignant brain tumors have the skull opened surgically to expose cancerous tissue to radiation from a beam of neutrons at the Massachusetts Institute of Technology nuclear reactor at Cambridge, Mass. Through the window, consisting of a tank containing zinc bromide solution to absorb radiation, surgeons from Massachusetts General Hospital are seen preparing a patient for treatment.

MEDICINE

Relieves Blood Pressure

➤ PROLONGED TREATMENT of high blood pressure with guanethidine, or Ismelin, is successful.

Two studies of the drug's effects, each made on 38 patients, is reported in the Journal of the American Medical Association, 175:543, 1961. Drs. Irvine H. Page, Richard E. Hurley and Harriet P. Dustan of Cleveland said guanethidine had "the advantage over ganglioplegic (nerve-blocking) drugs in that sympathetic function is blocked, while parasympathetic is spared."

The parasympathetic nerves are part of the autonomic or self-governing nervous system, which controls activity below the level of consciousness, as the secretion of glands, intestinal action and heart action. The sympathetic nervous system is the other part. By the use of guanethidine it is claimed that the operation known as sympathectomy is made unnecessary. It is still performed for hypertension, or high blood pressure.

Drs. John T. Eagan and Edward S. Orgain of Duke University Medical Center, Durham, N.C., who treated another 38 patients, said (p. 550) that final conclusions regarding the ultimate usefulness of the drug "must await more extended experience." The drug was developed by Ciba Pharmaceutical Products, Inc., of Summit, N. J.

The physicians of America also will be reading in their official magazine that:

The first two operations performed with electrical anesthesia were successful and opened new vistas in anesthesia and clinical neurophysiologic research (p. 599). Reported by Drs. James D. Hardy, Leonard W. Fabian and M. Don Turner of the University of Mississippi Medical Center, Jackson, the operations drew editorial comment (p. 606).

The editorial said if further trial makes the technique safe for routine use, "dental extractions, animal work, burn dressings, and short operations under conditions of field warfare" would be desirable. The patients undergoing electrical anesthesia had advanced cancer.

A rare case of paralysis through tick bite occurred in a lumberman in Florida woods. Dr. F. W. Henderson, Lake City, Fla., reported (p. 616) that the man recovered after the ticks were removed. The ticks were male, considered less likely than female to cause paralysis. Also the ticks were the previously unsuspected lone star variety *Amblyomma americanum*.

The physician emphasized the need to search for ticks as a possible cause of ascending paralysis, which can cause death if not recognized early.

• Science News Letter, 79:132 March 4, 1961

MEDICINE

Find Potent Hormone

➤ A PITUITARY HORMONE, as yet unnamed, has been found to be more powerful than ACTH in making fat move in or out of tissues. This may throw light on the cause of atherosclerosis, a form of hardening of the arteries.

Dr. Daniel Rudman of Goldwater Memorial Hospital and Columbia University said that the new hormone substance is temporarily called "Fraction L."

Fraction L has the properties of a protein, made up of a long sequence of amino acids. More needs to be known of the hormone's biologic actions before it will be finally named.

The ultimate object of Dr. Rudman and his co-workers is to relate their findings in experimental animals to human disorders. So far they have found that the fatter the rabbit, the more responsive the animal is to the action of Fraction L.

The relationship of pituitary hormones to atherosclerosis is at the heart of the investigation. In seeking to understand the causes of atherosclerosis, Dr. Rudman's group is trying to find out the mechanisms regulating the amount of fats in the circulating blood.

The amount of fat in the blood is one of the important factors, although not the only one, in causing hardening of the arteries. The release of fat stored in the adipose (fatty) tissues of the body has until recently been overlooked, but it is known that one of the important regulatory agents is the pituitary.

The two other sources of fat in the blood are the diet and the body's own manufacture; sugar, for example, is rapidly converted to fat.

The New York Heart Association said the work of Dr. Rudman and his associates is "one more step up the ladder of knowledge in the complex subject of atherosclerosis and its relationship to the varying levels of fatty substances in the blood."

Dr. Forrest E. Kendall, professor of biochemistry, Columbia University College of Physicians and Surgeons, heads the project.

• Science News Letter, 79:132 March 4, 1961

PHARMACOLOGY

Tablets and Injections Help Low Back Pain

➤ PAIN CAUSED by arthritis of the spine, back sprains and bursitis has been alleviated by a new drug, Phenyramidol. A combination of tablets and intravenous injection is recommended.

Dr. Timothy A. Lamphier of Boston said in an interview that 74% of 300 patients he had treated showed excellent response.

Dr. Lamphier, who has had experience treating Boston Red Sox players, said many of his patients were industrial workers who have suffered sprains or other injuries in constructing the new East Boston tunnel.

The new drug provides two things, Dr. Lamphier said. It acts like codeine in killing pain, and it has muscle-relaxing properties.

The only side effects patients have noticed after injections are slight giddiness, a warmth that travels in a minute or two to the chest and then to the back, and a numbness of the tongue, along with a metallic taste.

• Science News Letter, 79:132 March 4, 1961

SCIENCE NEWS LETTER
VOL. 79 MARCH 5, 1961 NO. 9

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., NOrth 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is addressed. Your new address should include postal zone number if you have one.

Copyright © 1961 by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicated services issued by Science Service. Science Service also publishes CHEMISTRY (eight times a year) and THINGS of Science (monthly).

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees Nominated by the American Association for the Advancement of Science: William W. Rubey, University of California at Los Angeles; Wallace R. Brode; Douglas Whitaker, Rockefeller Institute for Medical Research. Nominated by the National Academy of Sciences: Harlow Shapley, Harvard College Observatory; Philip Bard, Johns Hopkins University; Henry Allen Moe, John Simon Guggenheim Memorial Foundation. Nominated by the National Research Council: Leonard Carmichael, Smithsonian Institution; John R. Dunning, Columbia University; Benjamin H. Willier, Johns Hopkins University. Nominated by the Journalistic Profession: Michael J. Ogden, Providence Journal-Bulletin; O. W. Riegel, Washington and Lee University; Lee Hills, Detroit Free Press. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; Frank Ford, Washington, D. C.; Charles E. Scripps, Cincinnati, Ohio.

Officers—President, Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: Wallace R. Brode; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Gladys Ball, Ann Ewing, Lillian Levy, Faye Marley, Jane Marye, Tove Neville, Marjorie Van de Water, Judy Viorst, Burrell Wood. Science Youth Division: Joseph H. Kraus, Shirley Moore, Dorothy Schriver, Leslie Watkins. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelson. Syndicate Sales: Hallie Jenkins. Librarian: Margit Friedrich. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410. Advertising Manager: Fred A. Moulton, MEtropolitan 8-2562.

ROCKETS AND MISSILES

Outdo Reds in 18 Months

▶ THE UNITED STATES can outmatch the Russians in heavy weight-lifting in space in 18 months, Harold Richey, president of the American Rocket Society, reported in Washington, D. C.

A contract study by the National Aeronautics and Space Administration shows this country could have a 21,000,000-pound thrust in a cluster of seven solid-fuel rockets ready to shoot in three years, he claimed. And, if in a hurry, the time could be cut in half, declared Mr. Richey, who also is director of the Ogden Rocket Operations Center of the Thiokol Chemical Corporation of Ogden, Utah. The cost would be about $5,000,000 to $10,000,000.

The rocket that shot the 7.1 ton Sputnik into orbit Feb. 3 and the one that sent the Russians' Venus vehicle on its way is estimated to have had 800,000 pounds of thrust.

The earliest estimate for the development of Saturn, a three-stage rocket engine powered by liquid fuel capable of 1,550,000 pounds of thrust, is 1965, Dr. Hugh Dryden, deputy director of NASA, told the House Committee on Science and Astronautics. More than $200,000,000 has been spent on Project Saturn to date, he said.

Dr. Dryden told the Committee that he believed solid fuel propulsion had a "great future," but that it was not yet as reliable as required for space launch. Solid fuel burns too fast to allow the time needed for maximum thrust. He did not favor replacing Saturn with a solid fuel rocket engine.

The space official foresaw a space gap of four to five years, but insisted this was limited solely to booster capacity. For scientific achievements in meteorology, communications and other areas, the U. S. holds the lead, he said. This scientific knowledge has been made available to the rest of the world.

Knowledge from Soviet probes has been "sketchy," he said. But whether this was due to a refusal to tell what has been discovered or whether there was nothing much to tell, Dr. Dryden could not say.

• Science News Letter, 79:133 March 4, 1961

SOCIOLOGY

Incompetence Favored

▶ A TOTALITARIAN system of government, such as the USSR, tends to promote to high positions a large number of persons of little competence and loyalty to the currently ruling party.

Drs. Karl W. Deutsch and William G. Madow of Yale University and Stanford Research Institute said these are the persons who change sides in each of the crucial political purges and survive them in accordance with the laws of probability.

In a totalitarian society, the sides a bureaucrat takes in a purge, either the winning or the losing, may be of much greater importance to his life and reputation than any decisions he may make on technical matters in his field.

If a government or a large private organization should come to be characterized by a succession of spectacular emergencies and if their bureaucrats should come to be judged mainly in terms of their performance in meeting them, the effects might be somewhat similar to those of a succession of major political purges.

In both cases a small sequence of important decisions will become decisive for personnel selection and promotion.

A related consideration would hold true for the reputation of large bureaucratic organizations dealing with the general public. The larger the number of decision-making bureaucrats in such an organization and the fewer the number of decisions to which the public pays attention, the easier it would be for the organization to impress the public with the wisdom of its high-level personnel.

The researchers report in a forthcoming issue of Behavioral Science that probability showed the selection and promotion of high-level personnel in large organizations may be seriously affected by supposed "wise men," if the number of men seeking to be decision makers is large while the number of important decisions is small.

Every major country has several hundred generals in its armed forces, yet each might have to make only half a dozen really important decisions in the course of his career. This way several so-called "military geniuses" may be produced by chance and be put into important positions without really being more able than other men to whom they are preferred.

• Science News Letter, 79:133 March 4, 1961

METAL PIECES FORMED BY ELECTRO-SPARK METHOD

TECHNOLOGY

Electrical Explosions Used to Shape Metals

▶ UNDERWATER ELECTRICAL explosions are used in a new process to mold hard-to-form metals such as titanium, stainless steel and tungsten.

The new process, described as "capacitor discharge electro-spark forming," is under development at General Electric Company's General Engineering Laboratory, Schenectady, N. Y. It makes possible the saving of millions of dollars a year in the working of these difficult metals.

In the process the metal to be shaped is placed in a die underwater. A build-up of electrical energy produces an explosion that directs high-intensity shock waves against the metal to be formed. The impact of the shock wave causes the metal to take the shape of the die immediately. Removal of air from the die is necessary to prevent irregularities on the metal's surface.

The need for TNT, dynamite or other chemical explosives in forming the metals is eliminated by the process. Electrical potentials up to 35,000 volts are used now, but eventually 100,000 volts or more will be used.

Manufacturing aircraft and missile parts will be greatly simplified by this process. Metals thus far successfully shaped include niobium (or columbium), molybdenum and certain beryllium alloys in addition to titanium, tungsten and stainless steel.

The fact that the forming is done at room temperature without preheating is a considerable advantage.

• Science News Letter, 79:133 March 4, 1961

INVENTION

Patents of the Week

A gritty mixture for better gripping power of tires, a self-propelled ski tow and a remote control device for car doors have been patented.

➤ WEARY COMMUTERS who frequently get stuck traveling when unexpected snowstorms create hazardous road conditions will probably welcome an invention just patented.

The invention is a gritty mixture that can be applied to tires, providing more gripping power. Expensive snow tires or chains are not needed, claim Glen and Dale Peterson of Tulsa, Okla., and Salt Lake City, Utah, respectively, who are brothers.

The mixture is housed in a can pressurized with inert liquefied gas. The can contains two separate compartments, one for a glue mixture, the other for a gripping material such as sand or pulverized pecan shells.

By pressing a button on the container, the highly pressurized materials combine and emerge from a spout onto the tire. The gritty material provides good traction, especially over short distances traveled by commuters. For this invention, the brothers received patent No. 2,971,793.

Another winter invention is a self-propelled ski tow for taking skiers quickly up the slopes. For the timid few who change their mind when they reach the top, the ski tow is also arranged for safe travel back down the slope.

The invention, given patent No. 2,971,475, consists of a trackway powered by an electric motor. Grasping bars, spaced at convenient distances on the trackway, provide a good grip for the skier. When the skier reaches the top, he merely lets go of the grasping bar.

Because the ski tow is only a few feet off the ground, there is no danger of falling in case of an accident, John M. Weber of Marenisco, Mich., claims in his patent. The inventor operates a ski resort in Michigan where his invention is used during the winter months.

Needless accidents caused when children accidentally unlock car doors while the car is in motion are intended to be prevented by an invention of William H. M. Green of Washington, D.C. His device, which received patent No. 2,971,755, permits drivers to lock and unlock car doors without using any control mechanism generally found on conventional doors.

The system operates by remote control. When the driver presses a button on the dashboard, a motor powers a cable system that moves a lever up or down, unlocking or locking the door.

The invention comes in kits and is said to be easily installed. The patent rights were assigned to Systems Control, Inc.

• Science News Letter, 79:134 March 4, 1961

OCEANOGRAPHY

1961 Ice Patrol Begins

See Front Cover

➤ THE INTERNATIONAL Ice Patrol broadcast its first iceberg warning of the year Feb. 22 to ships using the North Atlantic shipping lanes, the U. S. Coast Guard reported.

Although the Patrol started officially near the end of February, preliminary aerial observations have been under way since the first of the year.

A new ice-detecting method will be used experimentally this year in an attempt to increase the accuracy of spotting icebergs and floating ice. An expanded oceanographic survey program will also form an important part of the Patrol's activities.

For the first time, the Patrol will broadcast radio facsimile charts of ice conditions in the North Atlantic. This system provides the mariner directly with a chart of observed ice conditions, and has already proved valuable in routing ships through the Gulf of St. Lawrence and Arctic regions.

The new ice-detecting instrument is a "microwave radiometer," which measures the natural electromagnetic or radar waves given off by physical bodies. By comparing the strength of the different waves registered by the instrument, Patrol authorities can determine, even in the heaviest fog, whether the target is ice or a ship.

On the cover of this week's SCIENCE NEWS LETTER a UF-G2 Coast Guard plane is seen circling an iceberg off the coast of Newfoundland, checking its position. The iceberg is 150 feet high above the surface, 300 feet long and weighs about one million tons.

In addition to observing ice movement, the Coast Guard conducts studies of ocean currents and temperatures. These data, collected by its own oceanographic vessel Evergreen, enables scientists to predict iceberg drifting and rate of melting. The information is also important for long term studies of the little known ocean's functions.

The International Ice Patrol, which is conducted entirely by the U. S. Coast Guard, was formed in 1914 after the tragic sinking of the Titanic following an iceberg collision. Except for intervals during World War I and II, the Patrol has constantly been on guard during the ice season.

The Patrol is subsidized by 16 countries, representing major users of the North Atlantic shipping lanes.

• Science News Letter, 79:134 March 4, 1961

ROCKETS AND MISSILES

U. S. Space Successes Were Many in February

➤ FEBRUARY, 1961, was a month of space achievements beginning with the successful firing of the Air Force's solid-fuel Minuteman rocket.

But this and all other space accomplishments by the United States were overshadowed by the Soviet launch of a satellite to Venus, now almost one-third of the way to its destination.

Although the Venus shot was the most sensational, the United States also scored substantially in the space race with the launch by the Air Force of a Samos (spy-in-the-sky) satellite, and the Discoverer XX and XXI satellites, one carrying a scientific package and the other having a guidance system by which the orbit could be redirected from earth.

The National Aeronautics and Space Administration set in orbit its solid-fuel Scout satellite.

A Department of Defense attempt to launch two satellites, a Transit III-B on top of a Thor-Able rocket, into separate orbits was only a partial success. The satellites went into orbit, but joined like Siamese twins. However, their signals have been received.

This shot followed the successful test of NASA's Mercury capsule under the most severe survival conditions. The capsule, designed to take a man into sub-orbital flight this spring, was launched from an Atlas rocket. Its recovery was cheered by the three astronauts selected for final training for the coming launch.

The trio included Marine Lt. Col. John H. Glenn Jr., Air Force Capt. Virgil L. Grisson and Navy Cmdr. Alan B. Shepard Jr.

Which of these three men will be the first to pioneer on the space frontier will be known at the time of the launch, still not definitely scheduled.

• Science News Letter, 79:134 March 4, 1961

ROCKETS AND MISSILES

Testing of Missile Parts Is Part of Space Race

➤ SCIENTIFIC TESTING of missile and satellite components must keep pace with space achievements. As manned space travel crystallizes into reality, higher and higher standards of safety will be needed.

Keeping pace with advances in rocket and missile technology, scientists are continually devising a host of new engineering testing equipment.

Included in this group are ultrasonic and radiation tests reported to a symposium in San Antonio, Tex., on non-destructive testing of aircraft and missile components.

• Science News Letter, 79:134 March 4, 1961

EDUCATION

Aid to Education Sought

➤ IF PRESIDENT Kennedy's recommendations to Congress for Federal aid to education are passed, teachers' salaries and scholarships for students will be increased.

One of the President's programs calls for general assistance for public elementary and secondary school construction, and teachers' salaries in every state of no less than $15 per year for each student. For the three-year period, this program would cost $666,000,000 in 1962, $766,000,000 in 1963 and $866,000,000 in 1964.

Ten percent of the amount allotted each state in this program is to be used for special educational problems. Projects that might aid education in rural areas or slum areas, for the education of migrant workers, retarded children or especially gifted children could be carried out under this allotment. Projects related to segregation in schools, such as testing and improvement of reading ability, could be aided with this money.

Special projects would be submitted to the Secretary of Health, Education, and Welfare for approval.

The President also recommended extending the current College Housing Loan Program with a five-year, $250,000,000 a year program for residential housing for college students and faculty.

In addition he recommended establishing a long-term, low-interest rate loan program for such college facilities as classrooms, laboratories and libraries. Under this program $300,000,000 a year for five years could be loaned.

One of the President's proposed programs calls for a five-year scholarship plan for college students, averaging $700 each year per student.

The scholarships would be given without regard to sex, creed or color, but solely on the basis of need and ability, with 25,000 given the first year, 37,500 the second year and 50,000 each following year.

The student would have his own choice of school under this program. The scholarship program would cost about $600,000,000 during the five-year period.

• Science News Letter, 79:135 March 4, 1961

GENERAL SCIENCE

Schools of STS Winners

➤ THE SPECIAL contribution of American high schools in helping their promising senior science students earn national recognition and extensive future opportunities was cited in honoring the schools of the top 40 winners in the 20th Science Talent Search.

The schools of the winners have encouraged and supported these top level students and have made it possible for them to gain this recognition. Seventeen schools that have placed winners in the Search for the first time now join the distinguished ranks of winner-schools.

These new schools are: Western High School, Washington, D. C.; Melbourne, Fla., High School; Idaho Falls, Idaho, High School; Amundsen Senior High School, Chicago, Ill.; Highland Park, Ill., High School; Malcolm Price Laboratory School, Cedar Falls, Iowa; Atherton High School, Louisville, Ky.; Bladensburg, Md., High School; North Quincy, Mass., High School; Revere, Mass., High School; Southeast High School, Kansas City, Mo., Yeshiva of Flatbush High School, Brooklyn, N. Y.; Penfield, N. Y., Central High School; New Dorp High School, Staten Island, N. Y.; Fairborn, Ohio, High School; Beaverton, Ore., High School; Arlington Heights High School, Fort Worth, Texas.

One of these new schools, Bladensburg High School, Bladensburg, Md., is starting its record with a double entry, having placed two winners in the current Search.

The grand totals recorded for the schools that placed additional winners this year show Bronx High School of Science, New York, at the top of the list with 23 winners in the 20 years of the Science Talent Search for the Westinghouse Science Scholarships and Awards. Another New York school, Stuyvesant High School, is second, having recorded 21 winners in the 20 years.

Four new winners this year increase the grand total of Erasmus Hall High School, Brooklyn, N. Y., to 18.

Evanston Township High School, Evanston, Ill., is fourth on this year's honor roll with a total of 15 winners.

Central High School, South Bend, Ind., and Lyons Township High School, La Grange, Ill., are tied with five winners each. Two of Central High School's winners are new this year.

Four each are credited to East High School, Denver, Colo., and Omaha Central High School, Omaha, Nebr.

Three each are on record for Northside High School, Atlanta, Ga.; Jamaica High School, Jamaica, N. Y.; and Stephen F. Austin High School, Austin, Texas.

Placing winners for the second time are West High School, Phoenix, Ariz.; Coral Gables Senior High School, Coral Gables, Fla.; Joseph E. Brown High School, Atlanta, Ga.; New Utrecht High School, Brooklyn, N. Y.; Lourdes Academy, Cleveland, Ohio; Tippecanoe High School, Tipp City, Ohio; and Wakefield High School, Arlington, Va.

The 40 winners of the current Search will attend a five-day Science Talent Institute in Washington, D. C., from March 2 through March 6 and will be judged for $34,250 in science scholarships and awards made possible by the Westinghouse Educational Foundation. The Science Talent Search is conducted by Science Clubs of America (SCIENCE SERVICE) (See story p. 138).

• Science News Letter, 79:135 March 4, 1961

WORLD HELICOPTER RECORDS —Distance in a straight line and 102.392 miles per hour average speed won world records for test pilot Al Averill in a Bell 47G built by Bell Helicopter Company, Fort Worth, Tex.

ROCKETS AND MISSILES

Mercury Capsule Tested Under Severest Re-entry

➤ A MERCURY CAPSULE of the kind that will carry the first astronaut out into space has been successfully tested under the most severe re-entry conditions ever tried on this vehicle.

An Atlas rocket carrying the capsule, launched from Cape Canaveral, traveled 1,425 miles down the Atlantic and reached an altitude of 107 miles. On re-entry, the capsule was moving at 12,850 miles per hour, the National Aeronautics and Space Administration reported in Washington, D. C.

The re-heating rate was 30% higher than in a normal Mercury orbital re-entry. Temperatures ran 25% higher at some spots of the capsule. Air pressure was three times normal for the Mercury capsule, about 900 pounds per square foot.

Deceleration, or gravitational, load on the vehicle was twice that of normal re-entry of a Mercury capsule, 16 g's instead of 8 g's.

Purpose of the flight was to test the design and structure of the capsule.

• Science News Letter, 79:135 March 4, 1961

MEDICINE

Venereal Disease Rise Seen in British Teenagers

➤ BRITAIN, like the United States, is disturbed over the increase of venereal disease in its teenagers.

Of 464 prostitutes examined in prison, 36% were teenagers. Of the 145 teenage prostitutes examined, 48.9% had gonorrhea. Previously the British Cooperative Group found the increase in gonorrhea during a one-year period among the 18-to19-year age group was 27% in females and 36.3% in males.

Dr. C. S. Nicol of St. Thomas' and St. Bartholomew's Hospital, London, reports in the British Medical Journal, Feb. 18, 1961, that about 20% of the strains of gonococci have become partly resistant to penicillin. A higher penicillin dosage or another antibiotic was advised in such cases.

Gonorrhea is easy to cure, Dr. Nicol states, and on this account many patients run repeated risks. In seven large clinics 7,531 cases were found among 5,757 patients in one year, confirming that repeated infection is fairly common.

"The control of venereal diseases," Dr. Nicol says, "must depend on the tracing of infecting and infected contacts."

In Britain a voluntary system is followed with contact slips handed to all infected patients. Best results are obtained, Dr. Nicol believes, when a highly trained social worker assists. Also, he advises that a welfare officer be sent to visit those who start treatments but do not continue them.

• Science News Letter, 79:136 March 4, 1961

AERONAUTICS

NASA Space Institute To Open in New York

➤ THE FIRST INSTITUTE for space studies will begin formal operation in New York City this May, the National Aeronautics and Space Administration has announced.

The new facility, designated the Goddard Institute for Space Studies, will serve as an arm of the theoretical division of the Goddard Space Flight Center located at Greenbelt, Md. It will be headed by Dr. Robert Jastrow, who also will maintain his present position as chief of the theoretical division at Greenbelt.

"We expect to profit in our theoretical research program by drawing on the great pool of talent that is collected within the universities and research centers of the area," Dr. Jastrow said.

Those who will be enrolled in the institute will be selected from graduate students working toward a doctorate degree in physics, astronomy or the earth sciences from such schools as New York University, Columbia, Princeton, Yale and the Institute for Advanced Studies at Princeton.

The staff will be made up of NASA scientists working in close association with members of the faculties of participating universities and research institutions, Dr. Jastrow said.

The program will include basic theoretical research in all fields having a bearing on the NASA space science, such as studies on the structure of the earth, the moon and other planetary bodies in the solar system; the atmospheres of the earth and other planets; the origin and evolution of the solar system; the properties of the interplanetary plasma; sun-earth relationships; celestial mechanics; and the structure and evolution of the stars.

A mathematical computer will be the only tool, other than their own mental creative ability and proficiency in their chosen field of study, available to the students and research staff of the new space institute, Dr. Jastrow said.

The computer will be used to check the validity of the theories in the various disciplines that may be advanced by the 50 members that will include the institute's student body and the supervising staff.

• Science News Letter, 79:136 March 4, 1961

MATHEMATICS

U. S. Scientists Receive Russian Math Data

➤ UNITED STATES scientists are five months ahead in receiving the latest Soviet mathematical information used in designing missiles and space vehicles as the result of a new compilation of Russian mathematical research just issued.

The joint project is the first of its kind. The cooperative effort of mathematicians in the U. S. and Russia was edited by Dr. J. R. M. Radok of the Polytechnic Institute of Brooklyn. The volume honors the 70th birthday of one of Russia's most prominent mathematicians, Dr. N. I. Muskhelishivili.

Of the 50 mathematical research reports contained in the compilation, 28 are from Russians and seven from the U. S. Other nations represented are Great Britain, Holland, India, Italy, Poland, Scotland and Sweden. There are three from Mainland China.

The project was initiated by the Academy of Sciences of the USSR and the English edition was sponsored in this country by the Society for Industrial and Applied Mathematics.

The pilot project shows that the Russians can cooperate, Dr. Radok said. One report, by the Russian Academician G. N. Savin, deals with the mathematical treatment of the problems of holes in shells. This has practical application to the design of missiles, submarines and missile-carrying Polaris submarine.

Dr. G. I. Taylor of the Cavendish Institute, Cambridge, England, reported on interfaces in coarse media, which applies to oil exploration.

Dr. Muskhelishivili, who won Stalin prizes in 1941 and 1946, is a deputy in the Supreme Soviet, and a poet as well. He is best known for his work in potential theory. This is applicable to such practical problems as the torsion and bending of steel beams, the behavior of elastic materials and other questions relating to mechanics.

• Science News Letter, 79:136 March 4, 1961

IN SCIEN

MEDICINE

Health Teams Serve Chronically Ill at Home

➤ HEALTH TEAMS consisting of a doctor, a public health nurse and a social worker are bringing home-care programs to chronically ill patients who tend to lose hope in hospitals.

More than 2,000,000 persons in the United States make use of some kind of nursing service in hospitals, nursing homes, at work, at home or in a public health center.

In the last ten years, Elizabeth Ogg reported in the Public Affairs pamphlet, Your Nursing Services Today and Tomorrow, about 50 hospitals and a few public health and welfare departments and visiting nurse associations have set up Organized Home Care (OHC) programs.

"A nutritionist, a physical or an occupational therapist sometimes joins the health team," Miss Ogg said. "Library, volunteer and homemaker services, meals-on-wheels and other community resources may be brought in to help you if you are disabled and homebound."

The pamphlet was written in cooperation with the National League for Nursing, an organization including non-nursing members in communities.

The league has come up with a patient's bill of rights concerning what can be expected of modern nursing service. The rights include that the patient receive the nursing care necessary to help him regain his maximum degree of health and that the nursing personnel who care for him are qualified, through education, experience, and personality, to carry out services for which they are responsible.

• Science News Letter, 79:136 March 4, 1961

SEISMOLOGY

Estimates Movement in San Andreas Fault

➤ HORIZONTAL MOVEMENT along along the San Andreas fault north of San Francisco has probably not exceeded one and one-half miles during the last three-six million years, Dr. Charles G. Higgins of the University of California in Davis, Calif., reported in the Geological Society of America Bulletin 72:51, 1961. The movement of the San Andreas fault is responsible for many of the devastating California earthquakes.

Previous higher estimates of movement since middle Pliocene time were based on studies along the fault scar south of San Francisco, which does not necessarily hold true for areas north of the city, Dr. Higgins reported.

• Science News Letter, 79:136 March 4, 1961

NE FIELDS

PUBLIC HEALTH

Many Lose Life Savings To Pay Medical Bills

➤ THE TRAGEDY of the self-respecting man who has to sell his home and use his lifetime savings because he gets cancer at 65 was pointed up by Secretary Abraham Ribicoff of the Department of Health, Education, and Welfare at his first news conference in Washington, D. C.

Charges that social security measures are unnecessary to insure medical care to a great many persons over 65 were refuted by Secretary Ribicoff. He said he knew of no study that could prove how many aging persons could take care of their own health needs.

"The vice president of an insurance company who is a friend of mine," he said, "was opposed to social security plans for medical care to the aging until his father-in-law became ill with cancer."

When the patient's savings were all used up after a year's illness, the insurance man had to shoulder all the expenses of hospitalization and changed his opinions. It is this kind of unpredictable expense that studies do not predict, the Secretary indicated.

Asked whether the Administration's plan for the medical care of our aging population would slow down insurance plans, the Secretary said he believed it would give impetus to private companies.

• Science News Letter, 79:137 March 4, 1961

BIOLOGY

Nature-Nurture Conflict Again Divides Scientists

➤ THE CONTROVERSY of whether environment or heredity—nurture or nature—has the most influence on intelligence has flared up again in scientific circles.

The present debate centers around a report by Hilda Knobloch and Benjamin Pasamanick of Ohio State University, Columbus. They found that of 1,000 Baltimore infants, only 1.8% had developmental quotients below 85. Developmental quotients are supposedly the infant equivalent of the I.Q. test used in later life.

Among school-age children, however, 14% had I.Q.'s below 85. The fact that most of the reduced scores occurred in the Negro and lower-class white portions of the population indicated, the Ohio researchers suggested, that environment played the bigger role.

In Science, 133:378, 1961, however, Dr. Gordon Allen of the National Institute of Mental Health, Bethesda, Md., questioned whether developmental quotient and intelligence quotient are equivalent measures of the same thing. He also pointed out that the Ohio researchers gave no evidence concerning the nature of the environmental factors that they believe to be the main determinants of intelligence.

In the same issue, the Ohio investigators stick to their guns and return the charge of "ambiguity" by stating that the geneticists themselves will need to give more than "post hoc data" to support their views.

Although Dr. Allen suggests that a meeting ground between the two camps may be found in studies of inherited metabolic diseases that result in brain damage and lowered I.Q. when certain foods are included in the diet, the behavioral scientists are cool to the idea.

• Science News Letter, 79:137 March 4, 1961

MEDICINE

Cancers React Differently To Same Radiation Dose

➤ THE APPEARANCE of a tumor is not a reliable guide to how much radiation is needed to kill it.

Dr. Anna Goldfeder of the cancer and radiobiological research laboratory at New York University has found that mammary tumors that look very much alike often react very differently to the same radiation dose. Cells from such tumors, irradiated and transplanted to test tubes, have shown considerable differences in their abnormal structure patterns.

Dr. Goldfeder also reported at a New York Academy of Sciences conference in New York that normal body tissues from the same person may vary in their responses to radiation.

In healthy, embryonic kidney fragments irradiated and grown in cultures, the white blood cells and certain cells that act as garbage collectors were killed by the same radiation dose that allowed kidney skin cells to go on growing.

The reason that some tissues resist radiation while others succumb, Dr. Goldfeder believes, lies in the quality and quantity of mitochondria, the organelles that appear as granules, rods or filaments in all cells.

• Science News Letter, 79:137 March 4, 1961

METEOROLOGY

Trees Cut Wind Flow Up to 40 Percent

➤ HOW MUCH trees that shed their leaves in the fall actually protect from the wind because of their leaves has been measured. Wind flow increases up to 40% near deciduous trees such as oaks, elms and maples after the leaves have fallen.

Ralph H. Frederick of the U. S. Weather Bureau office of climatology in Washington, D. C., reports in Monthly Weather Review, 89:39, 1961, that observations of wind flow showed that the wind decreases as leaves grow back on the trees in the spring.

He states the wind flow varies with the number of trees, with tree height and the distance between trees. He suggests that a mathematical formula might be worked out that will show the shielding effect on wind movement due to leaves.

• Science News Letter, 79:137 March 4, 1961

GENERAL SCIENCE

Japanese Know Science Facts, But Deny Interest

➤ ONLY ONE out of five Japanese in a public opinion poll admitted that they were interested in science and technology. Nevertheless 71% of those polled knew that the mosquito transmits Japanese encephalitis and 53% knew that the orange contains more vitamin C than apple and spinach.

The general survey of the level of scientific knowledge in Japan carried out last June by the Science and Technics Agency also showed that 84% of the people interviewed knew about the transistor and 42% knew about Salk vaccine for polio. The launching of satellites by the United States and the USSR was known to 83% and 49% admitted to being able to replace a fuse.

Chlorella, the algae proposed for use as food, were known to 15% queried, and the diode, an electronic device, was known to 10%. In spite of these results only 21% of the persons admitted to paying attention to science and technology and only 18% declared that they read science news every day. About 80% expressed no interest at all in science and technology.

The survey included 3,000 adults in 40 cities and 78 villages.

• Science News Letter, 79:137 March 4, 1961

METEOROLOGY

Many Weather Questions Are Still Unanswered

➤ MANY QUESTIONS about the atmospheric behavior must be answered before the weather, such as the battering series of snowstorms that hit the eastern United States in February, can be adequately controlled, the U. S. Weather Bureau reported in Washington, D. C.

The most promising method for controlling the weather is to squelch the storm in its early stages. Whirling weather satellites scanning the weather patterns would provide a much better observational system than meteorologists now have for detecting storms.

The first two experimental weather satellites, Tiros I and II, have already been useful in spotting cloud patterns associated with storms when they form.

The Weather Bureau has also been conducting basic atmospheric research during the past five years in its laboratries. High-speed electronic computers are working constantly, imitating the functions of the atmosphere.

Weather men are dealing with tremendous energies when they tackle storms, Dr. F. W. Reichelderfer, chief of the Weather Bureau, said. In one year, winds carry energy equivalent to about two billion atom bombs across the 40-degree latitude.

One of the storms that hit New York City dumped about 40,000,000 tons of snow. If the snow could have been melted to rain by applying heat, it would have required the heat equivalent of 120 atom bombs.

• Science News Letter, 79:137 March 4, 1961

GENERAL SCIENCE

Winners' Science Projects

The 40 Science Talent Search winners that will travel to Washington for the Science Talent Institute showed great resourcefulness in their projects, Shirley Moore reports.

➤ WITH ELECTRONIC computers being used to accomplish feats that sound like science fiction, some of the nation's most talented teen-aged scientists have launched their own explorations into computer science.

Computers have been put to work answering some of the biologist's most elusive problems, solving quadratic equations and proving thousands of geometric theorems by two of the top 40 winners of the Science Talent Search, Robert M. Axelrod of Skokie, Ill., and William D. Rothman of Brooklyn, N. Y.

Seventeen-year-old Bob Axelrod believes that computers may be able to tell space pioneers the best "balance of life" system for a spaceship and what sort of living creatures to expect to find in other parts of the universe. He also suggests that with the help of a computer paleontologists may be able to deduce the kind of environment in which ancient life forms developed.

In a report that helped him to become one of the winners in the Search, Bob described his attempt to investigate life forms by simulating them on a digital computer.

Bill Rothman, a 16-year-old senior from Brooklyn, has designed and built two computers christened the "Quadraticator" and the "Geometron." The first device can solve quadratic equations and factor quadratic trinomials. In building this 40-pound Quadraticator at a modest cost of $25, Bill made ingenious use of springs designed for ball point pens, rubber stamp bases, erector set parts and several miles of wire.

Geometron Costs $50

The compact, 50-pound Geometron cost $50 to put together and boasts a wiring system that looks like a mass of loosely woven spaghetti. This computer is capable of proving nearly all the exercises in Book I of standard high school and college geometry texts, says the young designer. When the given information is fed into the machine, it takes over from there and produces a complete formal proof with statements and reasons lighting up in logical sequence.

Bob and Bill will have a chance to debate their ideas with 38 other outstanding student-scientists when the winners come to Washington from all around the country to spend five days together at the Science Talent Institute, March 2 through 6. During the Institute the winners will be judged for $34,250 in Westinghouse Science Scholarships and Awards. The annual Search is conducted by Science Clubs of America, an activity of SCIENCE SERVICE.

Doves a-courting, crayfish a-molting and toads sitting on dry sand under a hot sun have been the unusual and productive subjects of scientific research for three 17-year-old boys who live in New York, Georgia and Florida.

Joshua Wallman of New York City has spent many hours at the Institute of Animal Behavior of Rutgers University observing and making motion pictures of the ritualistic bowing and cooing of male ring doves eager to impress female doves. Josh wanted to find out whether this kind of courting behavior was completely instinctive and not affected by the bird's receptors, as one theory states.

In his paper submitted to the 20th Science Talent Search, which helped him to become one of the top 40 winners, the young biologist reported that his experiments and observations convinced him that there is, instead, a feedback relationship between the dove's receptors and the central nervous system which involves esophageal air pressure.

When a female dove is put into the male's cage, the gentleman responds immediately by filling his esophagus with air, raising his head and foreparts and then bowing very low. As the dove makes his courtly bow, he coos at the lady. Having won her and having raised their first brood, he scales down subsequent courting of his mate. He goes on bowing, to be sure, but the bows are somewhat shallower and less dramatic.

James Michael Hosford of Atlanta, Ga., another winner in the Science Talent Search, investigated the function of gastroliths in crayfish and the effect of a molt-controlling hormone on these stony structures. He did research on his subject in the libraries of two universities, then designed experiments to discover the physical and chemical characteristics of the hormone that controls the molting of the crayfish.

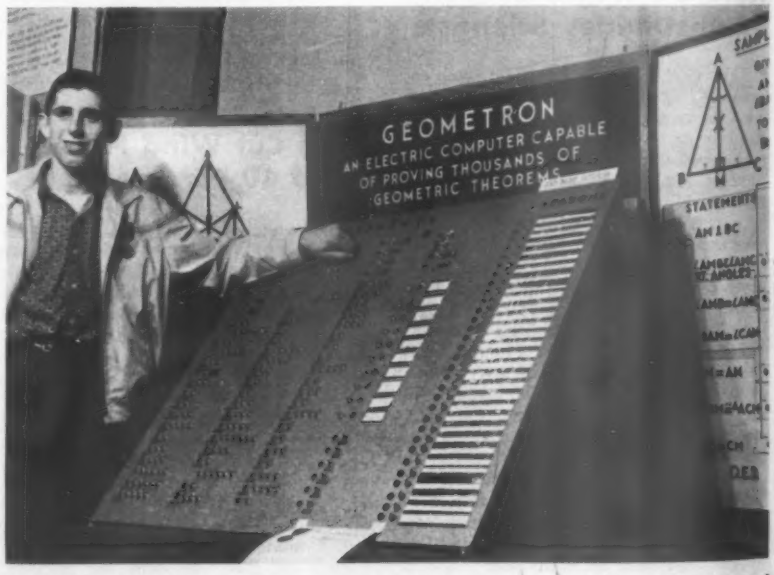
Finds Unknown Characteristics

Mike was able to find three previously unknown characteristics of the hormone. He reported in his Science Talent Search paper that this hormone is heat-resistant, has a large molecular structure and is a lipo-protein.

His work suggests that the hormone may be a steroid and, therefore, possibly related to cortisone. Since the hormone inhibits calcium deposits in the crayfish, it might also do so in humans and might have an effect on joint diseases such as arthritis and diseases concerned with over-calcification of the muscles.

The third biologist of the trio is William Milton Adkins III of Melbourne, Fla., who has spent the past three years experimenting in the field of stress. His specialty has been observing the reactions of southern toads to light, temperature and degrees of soil moisture when their pineal glands are shielded from light.

Studies being carried on in several lab-



PROUD WINNER—Bill Rothman with his Geometron at the 11th National Science Fair-International in Indianapolis, May, 1960.

oratories in the U. S. use fish and lizards as experimental animals. Bill has extended his investigations to amphibia, using southern toads for the studies reported in his Talent Search paper and currently using frogs for further work.

With the pineal gland shielded from light, the toad exposes itself to higher temperatures and light intensities and drier sand than normally preferred. Bill believes that normal functioning of the pineal apparatus in response to light is necessary for the survival and well-being of the toad, preventing the more rapid exhaustion of its energy resources.

Lines, Color Examined

Finding out how people see vertical and horizontal lines and whether fruit flies see color has kept two attractive young feminine scientists busy during hours that some high school girls dedicate to cokes and girlish gossip at the soda shop.

The vision experiments of Laura Sue Kaufman, 16, of Brooklyn, N. Y., started from her father's comment that in his work in calligraphy it was sometimes necessary to use unequal lines to make letters look regular.

Laura designed her own test cards to measure illusion factors of contrast, width, bisection and vertical position, and used her friends and their brothers, sisters and parents as her 33 test subjects. She found that the younger age group, 12 to 21 years of age, was less easily deceived by illusions, that bisecting a line makes it look shorter, that a vertical line appears longer than an equal horizontal one, and a high line longer than a lower one.

It was also evident that a line that stands out from its background looks longer than one that does not. All of these effects were more apparent when white lines were seen on black backgrounds.

Laura submitted complete records of her test data and conclusions as her project report in the 20th Science Talent Search. In combination with her score on the Science Aptitude Examination, academic achievements and personal qualifications, it won her the honor of being one of the 40 students judged most promising among the nation's science-talented high school seniors.

Vision of Fruit Flies

Another of the nine girls included in the winner group, Ann Mayer of Fairborn, Ohio, reported on her experiments to discover whether fruit flies see color.

"Although I do not know what the fly sees," she wrote, "it is definite that things are not seen the way humans see them."

Collecting the insects that were drawn to white, yellow and pink lights, Ann concluded that the flies responded to the intensity of the light and its physiological effect on the fly rather than to the color. She believes, however, that the physiological effect may be partly the result of color.

Ann also found that the color pigment in the eye of the fly itself has an effect on the perception of color. Although blue and green apparently look the same to a wild strain of Drosophila, they do not appear

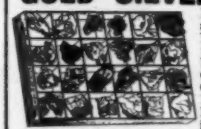
(Continued on p. 142)

BRUSH-OFF GOGGLES
Use that ounce of prevention. Spare your eyes.
Walking in woods or country side? Keep brush, twigs, leaves, brambles out of your eyes. Prevent wood-chopping wood-chip eye injuries. Brush-off Goggles sturdily made of fine wire screening and black cotton strapping. Fits over glasses. Same as used by Dept. of Forestry.
Each $1.00 p.p. 6 for $5.00 p.p.
HARRY ROSS *Scientific & Lab Apparatus* 61-L Reade St., N.Y. 7, N.Y.

New SUB-ZERO
Evergreen Ivy
Tests Show Special Strain Stands Weather 20° below Zero

Plant them in areas too shady for grass, in hard-to-mow places, on steep banks or as clinging vines on chimneys and walls, and enjoy their evergreen beauty all the year around.
First Time at Popular Prices. Heavily rooted. **Fresh Dug** plants—guaranteed to grow—direct from our nursery, postpaid at planting time.
12 for $3.50 25 for $6.50
100 for $25.00
Please order **Now** because our supply is still limited. Planting Guide for Ivies, Myrtle, Pachysandra, Wintercreeper and other ground covers free for the asking. Write to Dept. C-10.
THORNDALE FLOWER FARM, Woodstock, Illinois

GOLD • SILVER • URANIUM



LEARN How to Know and Identify Ores and Minerals. This Prospector's set of 24 Ores and Minerals, including Gold, Silver, Uranium, Copper, Lead, Zinc, Nickel and 17 others—PLUS a 192 page, fully illustrated manual, with easy to follow—step by step instructions; shows you how to identify hundreds of minerals.—Complete with magnifying glass—$4.95
MERRITT MINERALS
2112-L Fort Dearborn Sta., Dearborn, Michigan

COMPRESSED TABLETS
(Non-medical) Made to Order
Very small sizes to the very largest. Experimental work undertaken. If you need tablets made, write us for quotations.
R. P. CARGILLE LABORATORIES, INC.
117 Liberty Street New York 6, N. Y.

A MUST FOR CHEMISTRY & PHYSICS STUDENTS

The Elemental Slyd-Rul tells you, at a glance, symbol, weight, density, number, valences, color, melting and boiling point in °C for 98 elements. An ideal educational aid for science, physics and chemistry students. **$1 postpaid. Student rate: 12 or more, 75¢ ea. Money-back guarantee. Sorry, No C.O.D.'s.**
The Slyd-Rul Co., 1040 W. Broadway, Woodmere, N.Y.

VENUS FLY TRAP
EATS LIVE FLIES

Bulbs grow into exquisite house plants that catch and eat live insects! Bear white flowers on 12" stems. Green leaves form rosettes. Each leaf tipped with pink trap, holding nectar. When insect is in trap, it snaps shut, absorbs him, reopens. Also eats raw beef, or feeds normally thru roots. Easy to grow. Develops in 3-4 weeks.
3 Bulbs $1.00 Ppd.
18 Bulbs $5.00 Ppd.
Send check or money order
Satisfaction Guaranteed
SPENCER GIFTS CS-43 Spencer Bldg., Atlantic City, N. J.

SCIENCE BARGAINS
Order by Stock No.—Send Check or M.O.—Satisfaction or Money Back!

REPLICA GRATING—Low, Low Cost
Take Unusual Color Photos At Night!

It's here—after decades of effort. Replica Grating—on film—at very low price. Breaks up white light into full spectrum colors. An exciting display. 13,400 lines per inch. Diffraction Grating has been used to answer more questions about the structure of the material world and the universe than any other single device. Use it for making spectroscopes, for experiments, as a fascinating novelty. First time available such large size—so cheaply—comes in clear plastic protector.
Stock No. 50,202-Q—includes 2 pcs. 8" x 5 ⅛"—1 transmission type, 1 reflecting type. **$2.00 postpaid**

FLASHLIGHT POINTER FOR MOVIE SCREENS

Ideal for pointing out interesting features on movie, slide projection screens. Excellent lecture tool. For teacher use on maps, etc. Flashlight focuses an arrow where you point it.
Stock No. 60,117-Q.....**$9.50 Postpaid**

ATTENTION TEACHERS!
Elementary through college! New 96-page CATALOG of useful classroom learning and teaching aids. Science, math, physics, astronomy, biology, etc. Request EDUCATIONAL CATALOG—"Q."

MAGNETS—5¢ EACH

INEXPENSIVE CERAMIC MAGNETS—These are strong durable magnets ¾" x 1" and 3/16" thick with 3/16" hole in center. Excellent for classroom distribution. Also use for making magnetic visual aids for use on magnetic chalk boards, etc.
Stock No. 40,425-Q Package of 12 . . $1.00 Ppd.
Stock No. 60,142-Q Package of 100 . . $5.00 Ppd.
U-SHAPED MAGNETS—Large 5 ½" long poles ¾" x ⅛" with 2 ¼" between poles. Keeper included.
Stock No. 60,132-Q.....**$1.50 Ppd.**
BAR MAGNETS—Nicely painted, powerful Alnico magnets 6" long, 1 ¼" x ¾".
Stock No. 40,121-Q.....**$1.60 Ppd.**

NEW! EASY PAPIER MACHE MIX

Papier Mache has long been one of the most versatile modeling mediums. Ideal for modeling masks, relief maps, railroad layouts, etc. Till now, the main objection has been the mess and trouble of preparing it. This new mix ends all that. Just mix in ratio of one quart of water to one pound, knead to the consistency of dough and use. It is non-toxic, clean and odorless. Finished work can be drilled, sawed and sanded, painted or weatherproofed.
Stock No. 70,410-Q....**5 lb. pkg.—$2.75 Pstpd.**
Stock No. 70,411-Q....**10 lb. pkg.—$4.90 Pstpd.**

WOODEN SOLID PUZZLES

12 Different puzzles that will stimulate your ability to think and reason. Here is a fascinating assortment of wood puzzles that will provide hours of pleasure. Twelve different puzzles, animals and geometric forms to take apart and reassemble, give a chance for all the family, young or old, to test skill, patience, and, best of all, to stimulate ability to think and reason while having lots of fun. Order yours now
Stock No. 70,205-Q.....**$3.00 Postpaid**

BUILD A SOLAR ENERGY FURNACE

A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! Use scrapwood! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 3000°. Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens—14" diameter . f.l. 14"
Stock No. 70,130-Q, Fresnel Lens, **$6.00 Postpaid**

FREE CATALOG-Q
144 Pages! Over 1000 Bargains!

America's No. 1 source of supply for science experimenters, hobbyists. Complete line of Astronomical Telescope parts and assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories — Telescopes, microscopes, binoculars, infrared snooperscopes . . . items for making "Science Fair" projects, math learning and teaching aids. Request Catalog Q.
TEACHERS! Write for Educational Catalog Q-2
EDMUND SCIENTIFIC CO.
BARRINGTON, NEW JERSEY

• Books of the Week •

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

THE ACADEMICALLY TALENTED—William P. Richardson, Ed., Summary and Conclusions by Robert B. Hughes—*N. C. Health Council*, 118 p., paper, single copies free upon request direct to publisher, 3801 Holly Lane, Raleigh, N. C. Proceedings of the Sixth Conference on Children with Special Needs, held at Duke University in 1960.

ANTARCTICA: The Story of a Continent—Frank Debenham, foreword by Sir Vivian Fuchs—*Macmillan*, 264 p., illus., $5.50. History of Antarctic discovery, tells how man developed techniques of dealing with the problems of climate and isolation, and describes the value of Antarctic studies to mankind.

ATOMIC ENERGY RESEARCH IN THE LIFE AND PHYSICAL SCIENCES, 1960—U. S. Atomic Energy Commission—*GPO*, 175 p., illus., paper, $1.25. On basic research in medical and biological fields, high energy physics, metallurgy, chemistry and controlled fusion.

BARRON'S GUIDE TO THE TWO-YEAR COLLEGES—Seymour Eskow, preface by Lawrence L. Jarvie—*Barron's Educ. Ser.*, 370 p., illus., $4.95; paper, $2.98. Describes role of two-year colleges, gives regional list, directory of programs and directory of junior and community colleges, technical and vocational institutes.

HEATH SCIENCE SERIES, Book 7: Science in the Space Age. Book 8: Science and Your Future—Herman and Nina Schneider—*Heath*, 362 p., 402 p., illus., $3.44, $3.72. New science textbooks for grades seven and eight, extending revised series 1-6 into junior high school level.

THE HERRING GULL'S WORLD: A Study of the Social Behaviour of Birds—Niko Tinbergen—*Basic Bks.*, rev. ed., 255 p., photographs and drawings by author, $5. Based on observations and experiments, this study shows how the herring gull's brain and nervous system function.

HOW TO CHOOSE AND USE POWER TOOLS—R. J. DeCristoforo—*Arco*, 142 p., illus., $2.50. Manual for the home workshop, describing the purpose and best use of stationary, portable and multi-purpose tools.

HUMMINGBIRDS—Betty John—*Follett*, 32 p., illus. by Bill Barss, $1. For beginning readers.

INTRODUCTORY PLANT PHYSIOLOGY LABORATORY MANUAL—Edwin B. Kurtz, Jr. and Alan M. MacEwan—*Burgess*, 2nd ed., 74 p., paper, $3. Contains new experiments that require more detailed analysis of results by student.

JOURNAL OF CHEMICAL DOCUMENTATION, Vol. I, No. 1—Herman Skolnik, Ed.—*Am. Chemical Soc.*, 96 p., paper, $5.50; 2 issues per year; $10 annually. Offers new forum for the publication of technical papers of merit.

LABORATORY EXERCISES IN INSECT MICROBIOLOGY AND INSECT PATHOLOGY—Mauro E. Martignoni and Edward A. Steinhaus—*Burgess*, 75 p., illus., paper, $3. Aims to familiarize students with a few of the relationships existing between insects and microorganisms generally.

MATHEMATICAL BIOPHYSICS: Physico-Mathematical Foundations of Biology, Vols. I and II—N. Rashevsky—*Dover*, 3rd rev. ed., 488 p., 466 p., paper, $2.50 each. Brings together latest advances in the application of mathematics to the fundamental processes of biological organisms.

MONOPOLY ON WHEELS: Henry Ford and the Selden Automobile Patent—William Greenleaf, foreword by Allan Nevins—*Wayne State Univ. Press*, 302 p., $5.95. Authoritative and comprehensive account of the wide array of talents that had to be fused to form the foundation for the invention of the automobile, and the history of the famous patent litigation.

OPTICS AND OPTICAL INSTRUMENTS: An Introduction with Special Reference to Practical Applications—B. K. Johnson—*Dover*, 224 p., illus., paper, $1.65. Reprint of 1947 edition titled: Practical Optics.

THE PARASITIC WEAVERBIRDS—Herbert Friedmann—*U. S. National Museum (GPO)*, 196 p. photographs, paper, $1. On the evolution of brood parasitism in weaverbirds, with detailed descriptions of cuckoo finch, short-tailed and long-tailed widow birds, and paradise widow birds.

PHYSICS, THE PIONEER SCIENCE, Vol. I: Mechanics, Heat, Sound. Vol. II: Light, Electricity—Lloyd W. Taylor—*Dover*, 451 p., 502 p., illus., $2 each. Unabridged republication of 1941 edition.

PUL ELIYA, A VILLAGE IN CEYLON: A Study of Land Tenure and Kinship—E. R. Leach—*Cambridge Univ. Press*, 344 p., illus., $8. Scholarly contribution to social anthropology, presents detailed analysis of how land is owned, used and transmitted to later generations in an arid plain where habitation depends on elaborate irrigation system.

REFLECTIONS OF THE MOTIVE POWER OF FIRE—Sadi Carnot, introd. by E. Mendoza—*Dover*, 152 p., illus., paper, $1.50. Includes also papers on the Second Law of Thermodynamics by E. Clapeyron and R. Clausius, first published in 1899.

RESEARCH HIGHLIGHTS OF THE NATIONAL BUREAU OF STANDARDS: Annual Report, Fiscal Year 1960—V. A. Astin, Dir.—*NBS (GPO)*, 189 p., illus., paper, 65¢. Review of research in metrology, radio standards, heat, radiation physics, data-processing systems and many other fields.

SCANDINAVIAN STUDENTS ON AN AMERICAN CAMPUS—William H. Sewell and Oluf M. Davidsen—*Univ. of Minn. Press*, 134 p., $3.50. Based on intensive, repeated interviews of 40 students from Norway, Denmark and Sweden, enrolled for two years at University of Wisconsin.

SPACE—Marian Tellander—*Follett*, 32 p., illus. by R. Hodgell, $1. Beginner's book about our solar system.

SPACE FACTS: A Handbook of Basic and Advanced Space Data for Scientists and Engineers—*General Electric, Missile & Space Vehicle Dept.*, 64 p., illus., free upon request direct to publisher, 3198 Chestnut St., Philadelphia 4, Pa. Reference source of most-used data.

TEACHING LEFT-HANDED CHILDREN—Margaret M. Clark—*Philosophical Lib.*, 44 p., illus., $2.75. The findings of a study published in 1957 by the Scottish Council for Research in Education.

TO THE SUN? OFF ON A COMET! Space Novels—Jules Verne, transl. by Edward Roth—*Dover*, 462 p., illus., paper, $1.75. Unabridged reprint of Roth translation.

TOBACCO, EXPERIMENTAL AND CLINICAL STUDIES: A Comprehensive Account of the World Literature—P. S. Larson, H. B. Haag and H. Silvette—*William & Wilkins*, 932 p., $20. Monograph compiled and abstracted from more than 6000 articles on the biological and medical effects of tobacco. Partly supported by grant-in-aid from the Tobacco Industry Research Committee.

TRANSLATIONS OF RUSSIAN GAME REPORTS, Vol. 7: Selections from "Acclimatization of Muskrats in the USSR"—N. P. Lavrov—*Canadian Wildlife Service (Queen's Printer)*, 150 p., maps, paper, $1. About practical measures and scientific investigations connected with the highly successful experiment of building up the Russian muskrat industry.

• Science News Letter, 79:140 March 4, 1961

Understanding Yourself

THE MENTAL HYGIENE OF PERSONALITY
By Dr. Ernest R. Groves

This inspirational book, now in its well-merited 8th printing, has helped thousands to live more wisely, more fully, more happily, more effectively—in the best sense, more profitably; for a thorough understanding of self is the very bedrock foundation on which to build for peace of mind and sound mental health.

"Dr. Groves writes this book to help individuals explore themselves and discover their inner cravings and capacities. . . . An excellent book."—Today's Health, published by The American Medical Assn.

"The attempt of the book is to provide means by which the reader can come to a better understanding of himself. All emphasis is on the utilization of one's mental and physical equipment in such a way that happiness and efficiency may be realized."—Scientific Book Club.

CONTENTS: I. The Human Quest — II. The Framework of the Personality—III. The Chemical Self—IV. Body Management—V. The Headquarters of the Self—VI. Our Strategic Center—VII. Our Cultural Watershed—VIII. The Scars of Childhood—IX. The Fateful Passage—X. Our Psychic Power Plant—XI. Uncovering the Hidden Self—XII. The Mind Finds Wings — XIII. The Windows of the Mind—XIV. Sex, Friend or Enemy—XV. The Supreme Fellowship — XVI. Consider the Stars — Appendix.

$3.50 Postfree • 10-Day Money-Back Guarantee

EMERSON BOOKS, Inc., Dept. 207-M
251 W. 19th St., New York 11

ROCKETS, OLYMPICS U.N. STAMPS---only 10c

Giant Stamp Collection Including: Moonrocket sets, Satellites, Atomic Ship, Boy Scout issues, Cpl. UN Set, Latest Olympics & Sport issues from Togo, Mongolia, Paraguay, Germany, Romania, etc. Plus Big Stamp Dictionary and approvals. Everything 10¢!

STAMPEX, Box 47-CNL
White Plains, N. Y.

PRISMS, GIANT SIZE

Brilliant crystal white optical crown glass. Dozens of wonderful things to do and make. Capture sunlight rainbows. Secret pictures with cameras. See around corners. See upside-down, etc. 6⅜" x 2" 45-90 deg. Aluminized back. Mounted U. S. Surplus. Mrs. M. R., New York, writes, "I have ordered four of these and they are beautiful when taken out of the case." U. S. Gov. cost $22.00—

NOW ONLY $2.50 Plus 85¢ for 3 Lbs. Postage

HARRY ROSS *Scientific & Lab Apparatus*
61-L Reade St., N.Y. 7, N.Y.

Do You Know

More than two-thirds of last year's agricultural *exports* from the United States went to 14 countries, the largest importer being the United Kingdom.

The *"Petrified Forest"* in Yellowstone Park contains the remains of about 27 ancient forests, one above the other.

Ambergris, used as a base for the world's choicest perfumes, was once valued at more than its weight in gold.

• Science News Letter, 79:140 March 4, 1961

Kodak reports on:

how you too can crack the 2500Å barrier . . . a book for those who plan to change worlds . . . fish, raisins, chicken, bananas, and distilled acetylated monoglycerides

Ultraviolet swab

Even the sports pages are carrying help-wanted ads for infrared experts. Infrared is riding high. Let's not forget that at the other end of the visible spectrum the old ultraviolet is still there.

In order to stir up interest in the ultraviolet, we shall show you how to sensitize photographic plates below 2500A, the wavelength down to which all photographic emulsion responds but below which the gelatin of the emulsion starts to intercept the energy so that people don't bother as much as they should with the spectral lines and other interesting phenomena down there.

Working thus in the darkroom, you can extend the sensitivity of any of the numerous Kodak Spectroscopic Plates *down to 1000A, even those sensitive to 1.2μ in the infrared. To find out what sensitizations are available for extending, and how to make up* U-V sensitizer, *write Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y.*

The student who took advice

So much buy, buy, buy on all sides! Many a scientific man says the clamor is too overwhelming. Perhaps it is unwise to irk him further by suggesting that his own kind bears no small part of the credit for having caused the din to be set up.

In the early 1900s Sir William Ramsay, the physical chemist who discovered the noble gases, strongly advised a student of his named Mees to get a job in industry instead of following the traditional scientist's livelihood of teaching. The young fellow therefore went to work for Wratten & Wainwright, a small firm that made photographic plates. Actually, until not so long before, Mrs. Wratten, the senior partner's wife, had been making them in her kitchen, quite successfully flowing the emulsion from a teakettle onto glass.

But young Mees brought science into the operation. The union of science and industry was blessed with new products for Wratten & Wainwright. They attracted the attention of Mr. Eastman, of Kodak, who decided it would be good for *his* business, too, to apply some science to it. Instead of emulating Wratten & Wainwright, he bought their business and brought Mees to Rochester, N. Y., U.S.A., as Kodak's research director. This happened in 1912.

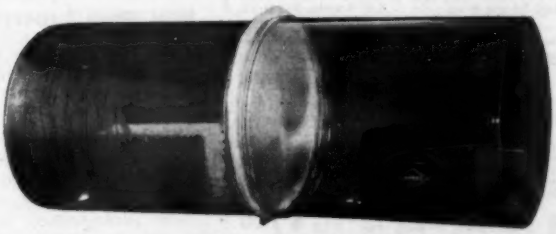
After 43 years in the job, Mees retired and wrote a book about his experiences in nurturing the chemistry and physics of one industry to churn out the stuff that has to be bought, bought, bought. His long, happy, and fruitful life ended last year. This month the book will be coming out under the title "From Dry Plates to Ektachrome Film" (Ziff-Davis Publishing Co., New York, $5.95 at many camera shops). It is recommended to those who want a very grown-up viewpoint on photography and its technology. It may also prove instructive to scientists in general who have made or are contemplating a switch from the world of scholarship to the world of commerce.

New and edible

The general public doesn't realize that we produce edible products with calories in them that a person can grow on and do pushups with. The newest of them bear the colorless designation "distilled acetylated monoglycerides." In front of the ungainly generic name we stick the trademark "Myvacet," which is easier to remember and shows we mean business. So far the business is confined to operating a small pilot plant and sending out technical salesmen to get food laboratories to accept samples with which to play and plan.

First the salesmen establish the distinction from *un*acetylated monoglycerides, another and equally real food which we have been producing by the ton for years as a texture-improver for fat-based foods and more recently for starch-based ones.

Then the salesmen undertake their mission of inspiration. They show this picture to fix in mind that "Myvacet" makes



a most effective barrier to water vapor. It also bars oxygen but not carbon dioxide. The solid "Myvacet, Type 5-00"* is far more flexible when cold than paraffin wax, which it resembles in feel and appearance but not in chemical nature.

The liquid "Myvacet, Type 9-40"** is a better gear and bearing lubricant, even under high pressures, than many petroleum-based products, yet, like the solid, it is unquestionably and officially*** edible and at the same time outlasts previously known edible oils against the forces of rancidity. As an intentional ingredient of shortening and table spreads, it makes their consistency almost independent of temperature. (As man inhabits more and more of the globe, he will need quite a few such ideas to keep himself in a good frame of mind.)

To send for our salesman and his samples, write Distillation Products Industries, Rochester 3, N. Y. (Division of Eastman Kodak Company.) Let him hint at new frontiers in fish-dipping, raisin-spraying, chicken-plucking, meat-freezing, and sealing the cut end of a hand of bananas so that the stalk can be left back at the plantation.

*A distilled monoglyceride of fully hydrogenated lard or cottonseed oil, with about half the glyceryl hydroxyls replaced by acetyl groups.

**A distilled monoglyceride of partially hydrogenated lard or cottonseed oil, with nearly all the glyceryl hydroxyls replaced by acetyl groups.

***United States Food and Drug Regulations, Sec. 121.1018.

Kodak
TRADE MARK

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

HACKMANITE—Chameleon of Minerals

IT'S SOLID MEN! (from Solid State Physics, that is.)

Send $2.00 or $3.00 for a piece of this fascinatingly interesting mineral with its varied physical properties. 1) Fluorescence, 2) Thermoluminescence, 3) Reversible Photosensitivity. How? Why? When? Literature free with each mineral sample purchased.

Hackmanite specimen according to size $2.00 or $3.00 p.p. with free instructions.

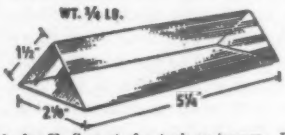
HARRY ROSS *Scientific & Lab Apparatus* 61-L Reade St., N.Y. 7, N.Y.

IDENTIFY ANY TREE!

Two-volume set by foremost dendrologist. W. H. Harlow, "Trees," full text, 950 photos, covers 140 common trees of N. and N.E. USA. "Twig & Fruit Guide," enables you to identify trees & shrubs in winter, any season. Identification, folklore, uses, etc. Total 444 pp. $2.60 plus 10¢ postage. Money-back guarantee. Dept. SNL, DOVER, 180 Varick St., N. Y. 14, N. Y.

PRISMS $1.50

WT. ¼ LB.



Made for U. S. govt. for tank periscopes. Fine optically ground, big precision prisms with silvered base. Terrific for all types of spectrographic work, in homemade telescopes & other optical systems for bending rays. Makes unusual paper weight (paint your name on it) or conversation piece for mantel. You'll find many other uses. NEW, PERFECT! Cost U. S. govt. $25 ea. **NOW—$1.50 ea. ppd. or 4 for $5.00.** Same as above—1" long (no silver backing) **$1. ea. 6 for $4.** Postage paid on prepaid orders. Calif. res. add sales tax.

Volume Sales Co., War Assets Div., Dept. C91 3828 Sunset Blvd. Los Angeles 26, Calif.

FORD PROFESSIONAL STETHOSCOPE

Ford model $2.50 — Bowles model $3.50 Combination Ford and Bowles $4.50

Brand new famous Ford Professional sensitive Stethoscope designed for physicians. Ideal, too, for use by electronics workers, engineers, etc., to check trouble spots in motors, check liquid flow, pulsations, etc. U.S. made.

24 **CAMELS HAIR BRUSHES** Full range 2 each nos. 1-12 finest bristle. Perfect for artists, hobbyists, homeowners. **$2.00**

25 **BALL POINT PENS** All plastic, retractable, refillable, top action, first quality INKBALL **$1.00**

12 PC. **WOOD CARVING KNIFE SET** Surgical steel, hand ground. 12 different shapes and edges to do every job. 4½" handles. **$1.50**

TRUVAL Dept. SN-1 415 South Broadway Yonkers, N. Y.

GIANT 30 Ft.

25¢ 2 Ft. Beach Ball Size

Inflate to Giant 20 to 30 ft. diameter with air or gas. Flying Advt. visible for miles. Great fun at Beach, Water Sports, etc. Terrific for attracting crowds at Openings, Fairs, Roadside Stands, Gas Stations, sports events. Use as Water Markers and buoys. Made of genuine Neoprene Rubber for extra durability. Never used. Orig. value $20. Limited Quantity. Special offer only $2 each plus 50¢ ea. post. & handling charge. (5 for $10) other sizes available. Comp. p.p. No C.O.D.'s.

2 ft. dia	25¢ ea. pp	5 for	$1.00 pp
6 ft. size	59¢ ea. pp	2 for	$1.00 pp
10 ft. size	1.00 ea. pp	6 for	$5.00 pp
15 ft. size	1.50 ea.	+35¢ post. & hdlg. 7 for	$10.00 pp

NOVEL MFG. 33 2nd Ave., Dept. G-3628 New York 3, N. Y.

Winners' Science Projects

(Continued from p. 139)

similar to the scarlet and brown strains of the fruit fly.

The young entomologist is now attempting to condition the Drosophila to colored light. If she is successful in this experiment, she believes that she will have proved that the flies do have true color perception. The next step will be a detailed study of the physiology of the eye.

Apparently 11 or 12 years old is not a whit too soon to begin active preparation for a professional career in physics research.

At 16, Roger M. Phillips of Western Springs, Ill., already has five years of intense interest in nuclear physics and four years of well planned experimentation and self-training behind him.

During these years he has methodically explored: radioactive tracers through ten demonstrations of their use in studying metals, plants and animals; more complicated experiments using radioactive tracers to study animal metabolism and plant growth regulators, tracer techniques in researching solid state diffusion of zinc into lead; and electron paramagnetic resonance through the design construction and application of a radio frequency electron paramagnetic resonance spectrometer.

Will Meet Experts

Roger reported his four years of experience with the peaceful atom to the 20th Science Talent Search. He became one of the 40 top winners from all over the country and during the trip to Washington, D. C., for the five-day Science Talent Institute in March, he will have an opportunity to talk with some of the nation's most distinguished physicists and to see some top level physics laboratories in action.

Another highly promising future physicist among the Science Talent Search winners is John Craig Wheeler, 17, of Idaho Falls, Idaho, who already has produced his own design for a proton accelerator. This is a colliding beam accelerator on which proton pulses are accelerated one-half cycle out of phase from both ends of the tube, colliding at a ring-shaped electrode.

The accelerating tube is designed so that the effectiveness of the available energy is doubled. Extensive high voltage rectification is not necessary since alternating current is used.

Novice scientists are eagerly looking into such important subjects as the sensitivity of bacteria to irradiation, the action of drugs on cancer, the biochemistry of leukemia and a rapid, accurate diagnostic technique for diseases of internal organs.

For example, a 16-year-old Chicago boy, Barry R. Dworkin, carried out experiments designed to discover the exact point in the life cycle of the common intestinal *bacterium E. coli* when it is most sensitive to X-ray irradiation. He built a high voltage X-ray machine, an electronic thermostat and a differential densitometer, a device to count bacteria very rapidly. Using this equipment for repeated tests, Barry concluded that the bacterium is most sensitive immediately after it has divided and that it then becomes relatively insensitive.

Studies Leukemia

Rita C. Manak, 16, of Cleveland, Ohio, explored the biochemistry of leukemia to prepare herself to help in possibly solving the question of whether the metabolism of normal white corpuscles, or leukocytes, differs from that of leukemic leukocytes. As a first important step, Rita studied and analyzed the metabolic steps performed by a normal leukocyte.

For four years Bernard S. Rappaport, 17, of Staten Island, N. Y., has been interested in paper chromatography as a promising technique for making screening tests for liver, kidney and related internal disease. Now he has devised an inexpensive, rapid and accurate method of diagnosing diseases related to amino acid metabolism.

Cancer research has been the special project of Robert J. Gordon, 16, of Brooklyn, N. Y. Since early tumors resemble inflammations of other types, he investigated the possibility of slowing or stopping the growth of cancers by using anti-inflammatory drugs.

He found that cortisone inhibited the growth of the Walker rat tumor, partly because of its general destructive effects on the body, and that acetylcholine increased the rate of growth. But a combination of the two drugs successfully inhibited tumor growth to 4.3% of the controls.

• Science News Letter, 79:138 March 4, 1961

MICRO-ADS

Equipment, supplies and services of special interest to scientists, science teachers and students, science-minded laymen and hobbyists. 25¢ per word, payable in advance. Closing date 3 weeks prior to publication (Saturday).

SNL, 1719 N St., N.W., Washington 6, D. C.

GOVERNMENT SURPLUS RADIOS, RECEIVERS, transmitters, gadgets, parabolic reflectors, infra-red snooperscopes, aircraft camera lenses. Amazing catalog 10¢. John Meshna, Malden 48, Mass.

NATIONAL GEOGRAPHIC MAGAZINES, 1888-1960, any issue. Periodical Service, Box 465-SN., Wilmington, Delaware.

MAKE OVER 100 MOLECULAR MODELS introducing three-dimensional concepts of atoms and molecules. Complete kit mailed postpaid for 75 cents coin or stamps. Ask for Things S-240. Science Service, 1719 N Street, N.W., Washington 6, D. C.

ROCKET BUILDING INFORMATION SHEET, 15 drawings of proven methods, 50 cents. Rockets, P. O. Box 90391, Los Angeles 45, Calif.

Questions

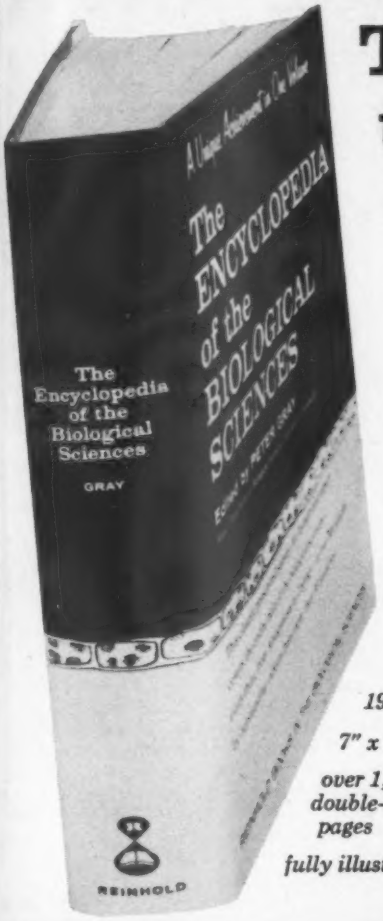
BIOCHEMISTRY—What is the minimum number of different forms of chlorophyll-a in plant cells? p. 131.

OCEANOGRAPHY—What is the new ice-detecting instrument used by the International Ice Patrol? p. 134.

Photographs: Cover, U. S. Coast Guard; p. 131, Massachusetts Institute of Technology; p. 133, General Electric Company; p. 135, Bell Helicopter Company; p. 138, Science Service; p. 144, Eastman Chemical Products, Inc.

A Unique Achievement in One Volume

OFFERED AT A SPECIAL INTRODUCTORY PRICE


A Unique Achievement in One Volume
The ENCYCLOPEDIA of the BIOLOGICAL SCIENCES
Edited by PETER GRAY
The Encyclopedia of the Biological Sciences
GRAY
REINHOLD

The Encyclopedia of the Biological Sciences

Edited by **PETER GRAY**
Head, Department of Biological Sciences, University of Pittsburgh

Special Introductory Price through April 15th, 1961: $17.50
List Price after April 15th, 1961: $20.00

ORDER NOW AND SAVE $2.50 ON THIS TRULY UNIQUE SURVEY OF THE ENTIRE FIELD OF THE BIOLOGICAL SCIENCES

1961
7" x 10"
over 1,200 double-column pages
fully illustrated

If it falls between *Abiogenesis* and *Zoogeography*, you'll find it in the *Encyclopedia of the Biological Sciences*. Over 800 full-scale articles cover in one unique volume the broad field of biological sciences as viewed by as many international authorities in the developmental, ecological, functional, genetic, structural and taxonomic aspects. The coverage, in addition, includes numerous topics in the fields of biochemistry and biophysics.

The treatment is entirely encyclopedic – that is, all articles describe and explain their subjects as well as defining them. Except for a few biographies, they vary from 500 to 3,000 words in length, and include pertinent illustrations. Articles on such current topics as *Biological Warfare* and *Space Biology* take their place beside such classical accounts as those on *Anthropoid* and *Bacteria*.

The *Encyclopedia* provides in a condensed, yet adequate form a comprehensive account of the increasingly complex Biological Sciences. There is no other single volume on the subject that even approaches its completeness of coverage.

The *Encyclopedia* makes available to professional biologists, students of biology, teachers, laymen – in fact, anyone who needs answers to the myriad questions involved with biology – an integrated and authoritative aid to their work and interests.

About the Editor: Since 1926, Professor Peter Gray has had published numerous papers on a variety of biological subjects, and has himself contributed to several encyclopedias. He received his doctorate in 1931 from the University of London before launching an extensive career of lecturing and research. He joined the faculty of the University of Pittsburgh in 1939, and became Head of the Department of Biological Sciences in 1947. He is a member of eleven professional societies, in addition to being an editor of *Biological Abstracts*. His determined efforts and editorial talents have contributed greatly to making *The Encyclopedia of the Biological Sciences* a significant milestone in the history of scientific literature.

Authorship Guarantees Highest Standards of Excellence

The contributors, experts from the world over – many of international reputation – strike a nice balance between up-to-the-minute presentation and classical accounts. They are drawn from more than 30 countries and the bibliographies appended to their articles cover the literature of the world.

Here is a small sampling of the articles and internationally known contributors

Actinomycetes—Selman A. Waksman, Rutgers
Anthropoid—J. S. Weiner, Oxford
Biochemical Individuality—R. J. Williams, Texas
Coniferales—P. Maheswari, Delhi
Dicotyledons—J. Hutchinson, Kew
Enzyme—Edwin C. Webb, Cambridge
Glumales—Agnes Chase, Smithsonian Institute
Hepaticae—Johannes Proskauer, California
Lateral Line—Alden B. Dawson, Harvard
Mathematical Biology—N. Rashevsky, Chicago
Origin of Life—A. I. Oparin, Bach Institute, Moscow
Radiation Effects—Roberts Rugh, Columbia
Skull—Torsten Pehrson, Stockholm
Trilobita—Leif Stormer, Oslo
Xylem—William L. Stern, Smithsonian Institute

—over 800 articles in all.

EXAMINE THIS GREAT WORK FREE!—SEND NO MONEY
Fill out the coupon below and your copy of *The Encyclopedia of the Biological Sciences* will be sent to you immediately upon publication.
Mail this coupon now to take advantage of introductory offer

REINHOLD

Publishers of the Encyclopedia of Microscopy, Encyclopedia of Spectroscopy, Encyclopedia of Chemistry

REINHOLD PUBLISHING CORPORATION, DEPT. M-775
430 Park Avenue, New York 22, N. Y.

Send me ____ copy (ies) of *The Encyclopedia of the Biological Sciences* for 10 days' Free Examination at the special introductory price of $17.50 each. (I understand that after April 15, 1961, the price is $20 each).

☐ Purchase price enclosed ☐ Bill me

Name.....

Address.....

City & Zone.....*State*.....

☐ SAVE MONEY! Check here if you enclose payment. In which case we pay all shipping costs. Same return privilege. Please add 3% sales tax on N.Y.C. orders.

New Ideas and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1081. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

PAPIER MACHE MIX, the latest convenience for hobbyists and artists, is prepared simply by adding one quart of water to a pound of mix and kneading till it is the right consistency. Finished work can be drilled, sawed, sanded. It will take watercolor or oil paints and may be weatherproofed with shellac or fixative. It is nontoxic, clean and odorless.

• Science News Letter, 79:144 March 4, 1961

FAUCET SEAL with solid-brass bearing eliminates drippy faucets in five minutes and can be installed by any housewife. It replaces all flat washers from size ¼ inch to ⅜ inch and lasts several times longer because built-in bearing eliminates wear and tear in use.

• Science News Letter, 79:144 March 4, 1961

REAR-VIEW MIRROR is king-size and clamps easily on an ordinary car mirror to triple the field of vision for auto drivers. The 15 by 2½ inch mirror, with rounded steel frame, gives a panoramic rear view and eliminates blind spots in watching traffic behind a car.

• Science News Letter, 79:144 March 4, 1961

MINNOW BUCKET TRAP of molded plastic simplifies catching and transporting live bait. The clear plastic trap, shown in the photograph, has funnel openings at both ends and an exclusive bottom construction that keeps it riding water currents. Plugging the openings with corks converts the trap into a carrying bucket. The bright red snap-on cap of plastic attracts minnows and provides easy access to contents.

• Science News Letter, 79:144 March 4, 1961

CITIZENS BAND WALKIE-TALKIE is a 9-transistor, portable radio transmitter-receiver. The 18-ounce unit has two controls to provide fast, efficient operation—on/off volume and push-to-talk. The unit receives and transmits from 1.5 miles up to 7 miles and may be operated without a license,

• Science News Letter, 79:144 March 4, 1961

PATCH AND REPAIR KIT has adhesive and sealant for permanent repair of furniture, ceramic tile, pipe leaks, china, gutters, downspouts, fabrics, aquariums and boats. Adhesive is waterproof, oilproof, nonflammable and resistant to chemicals. Kit includes self-measuring tubes, one each of resin and of hardener, and an applicator.

• Science News Letter, 79:144 March 4, 1961

FISHING LURE has heart-shaped eyelet to which treble hooks are mounted, instead of a circular attachment, to prevent twisted lines. The off-center hook arrangement acts as a stabilizer and eliminates twisting even when trolling. The lure comes in seven weights from 1/16 ounce to 1½ ounces in orange, yellow, white and black with contrasting patterns, and spinners in gold, zebra or chrome.

• Science News Letter, 79:144 March 4, 1961

HEADBAND WITH SUNGLASSES has a snap-apart feature so either one may be worn separately. The wrap-around band that holds hair in place is of hand-loomed wool in vibrant colors secured by a plastic bandeau. The glasses feature the new Continental frames.

• Science News Letter, 79:144 March 4, 1961

Nature Ramblings

► IN SPITE OF winter winds and frozen sod, the catkins of the willow trees will soon be out.

The catkins are actually compact flower buds. The willows are early blooming trees and must prepare their flowers during the previous growing season. Through the winter months the buds are covered by thin scales that protect them, not so much from the cold as from dehydration.

About this time of year, the bud begins to expand and finally breaks the waterproof seal between the scales and the twig. Eventually the scale case falls off, and there is the downy catkin. The fine catkin hairs are not a wool blanket but they do protect the bud from further drying and from bright light.

If the twigs are cut and kept dry, the catkins will remain in this stage of development, but if put in water they expand and flowers grow out from their hairy coverlets.

Each willow tree bears only flowers of one sex. Winds or bees carry the pollen from one tree to another. And different species are easily crossed.

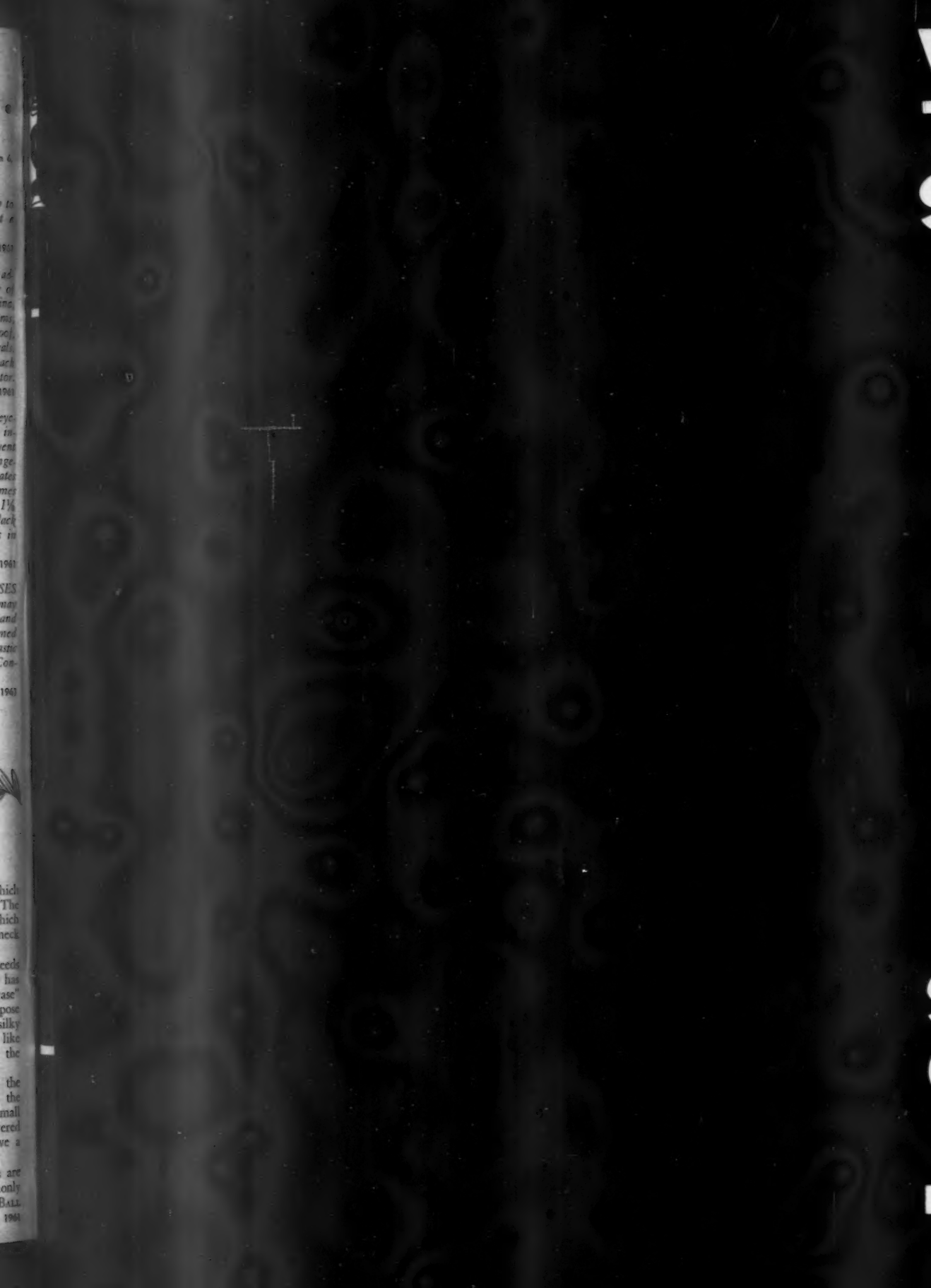
Pussy Willows

The staminate, or male, flower clusters are dotted with golden yellow pollen masses, and the pistillate, or female, flowers are a darker, reddish color.

The individual flowers of both sexes are simple in structure. The male has two or more stamens per flower, each of which looks like a long-stemmed mushroom. The female has only one pistil per flower, which resembles a slender vase with a narrow neck and a wide mouth.

Inside this "vase" are the ovules, the seeds or fruit of the willow. Before summer has arrived, the fruit matures, and the "vase" splits in two and curls downward to expose the seeds. Each seed has a tuft of silky hairs that help it ride the wind, much like the seeds of the cottonwood tree or the milkweed pod.

All the willows have catkins, from the large, wet-footed weeping willow to the alpine or arctic willow, which is so small that a full-grown specimen can be covered with one hand. The birches also have a type of catkin.

But the most popular catkin bearers are the two tall willow shrubs commonly known as pussy willows. —GLORIA BALL

• Science News Letter, 79:144 March 4, 1961